Slice Shear Force Protocol for Longissimus

Steven D. Shackelford, Tommy L. Wheeler, and Mohammad Koohmaraie

USDA-ARS U.S. Meat Animal Research Center

We recommend you send someone to our lab to be trained in person. However, if that is not possible the following description of the protocol is fairly detailed. If you have any questions, do not hesitate to call us.

This protocol is for longissimus. We are currently developing slice shear force protocols and their descriptions for 20 other muscles.

Standardized Equipment

To help ensure consistency across institutions a Slice Shear Force Kit is available that includes four items: a sizing box, a slice box, a double-bladed knife, and a slice shear force blade for either Instron/United or Texture Technologies testing machines. We strongly recommend using this kit.

Contact:
George Anderson
Gessford Machine Shop
Hastings, NE 68901
800-829-3448

Protocol

Within 1 to 2 minutes after recording final cooked temperature and weight, remove from the lateral end of each steak a 1-cm-thick, 5-cm-long slice that is parallel to the muscle fibers. This is a 3-step process.

Obtaining 1 cm-thick, 5 cm-long slice

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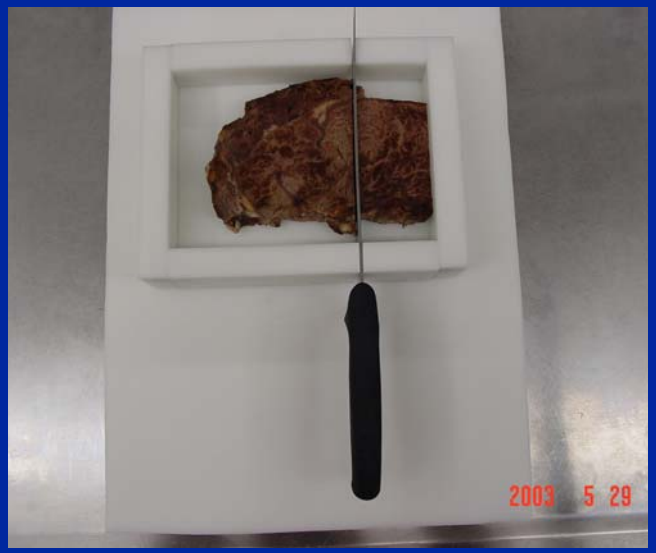

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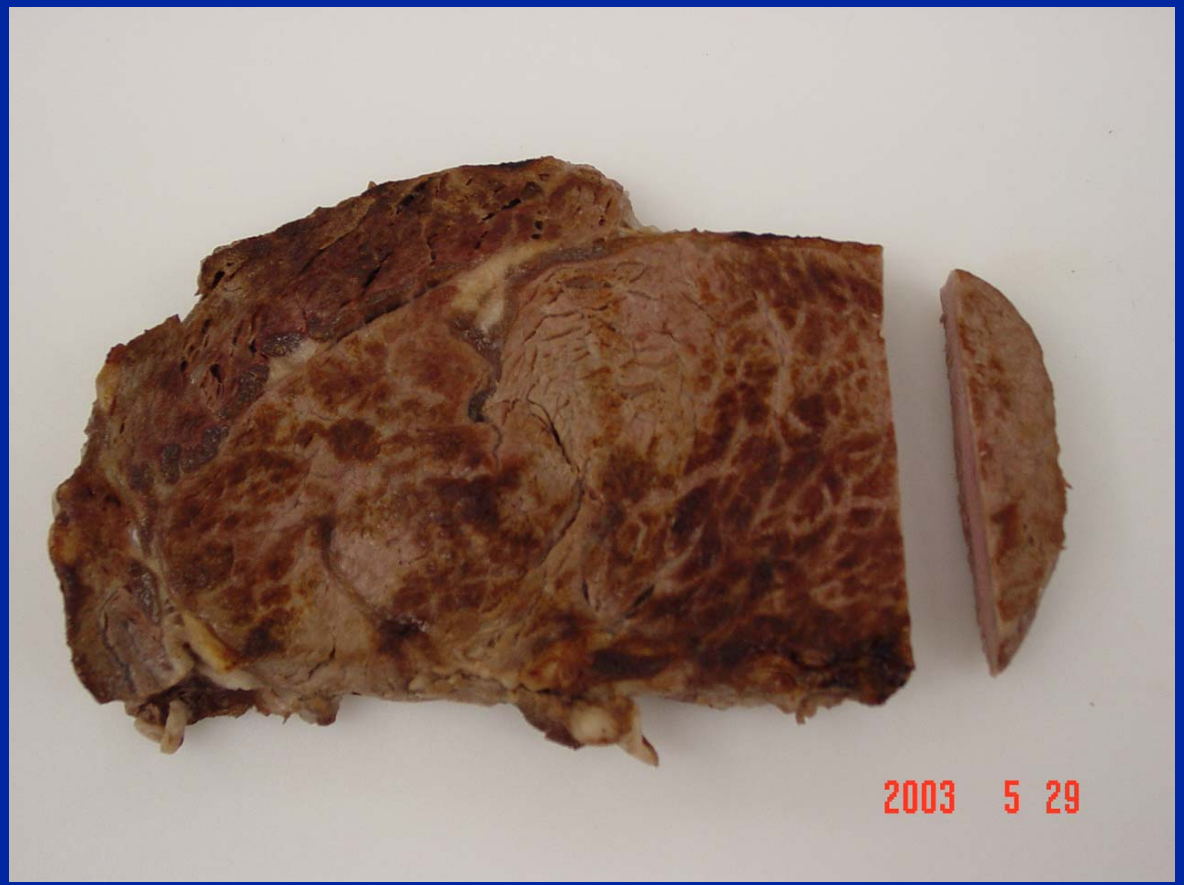
Protocol

1. A cut is made across the width of the longissimus at a point about 1 to 2 cm from the lateral end of the muscle.

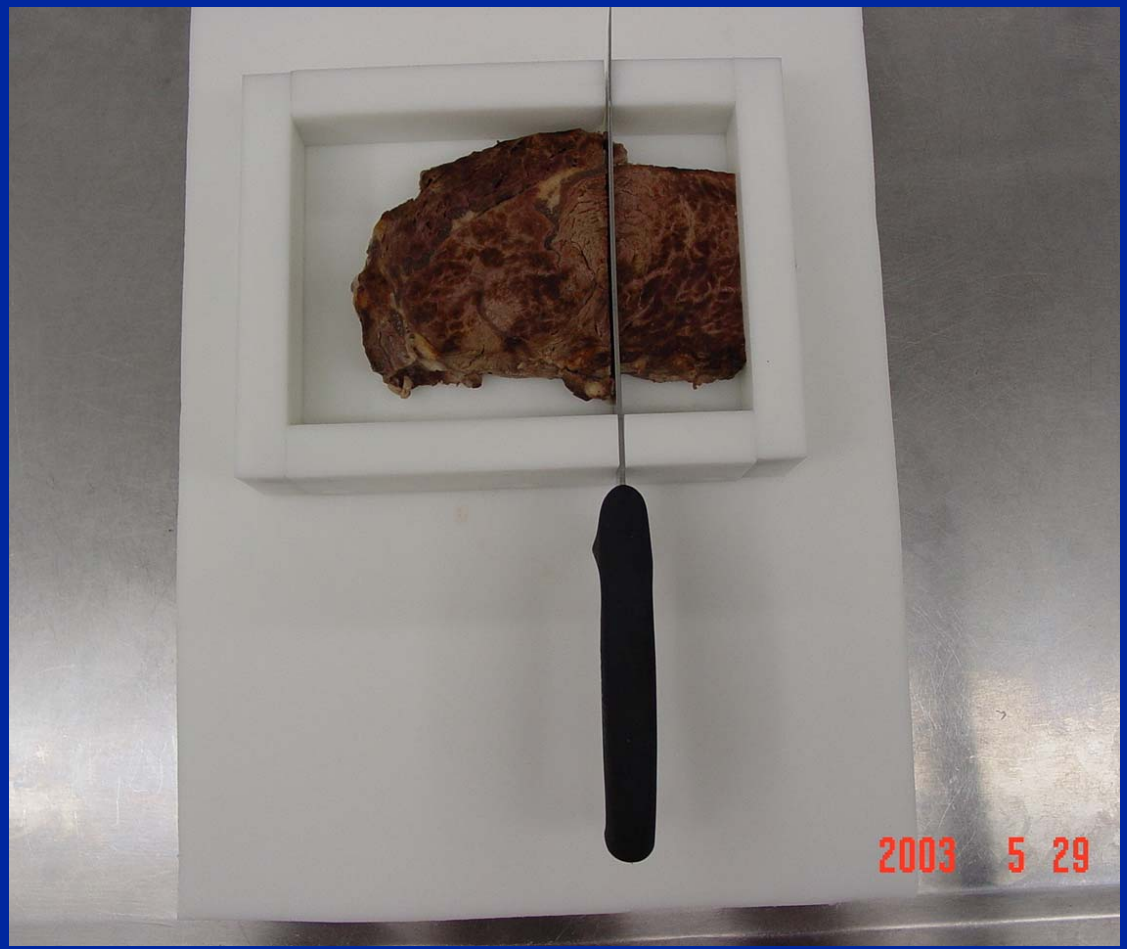
Step 1. Square off the end of the muscle



Protocol

2. Using the sample sizing box, a second cut is made across the width of the longissimus, parallel to and at a distance of 5 cm from the first cut.

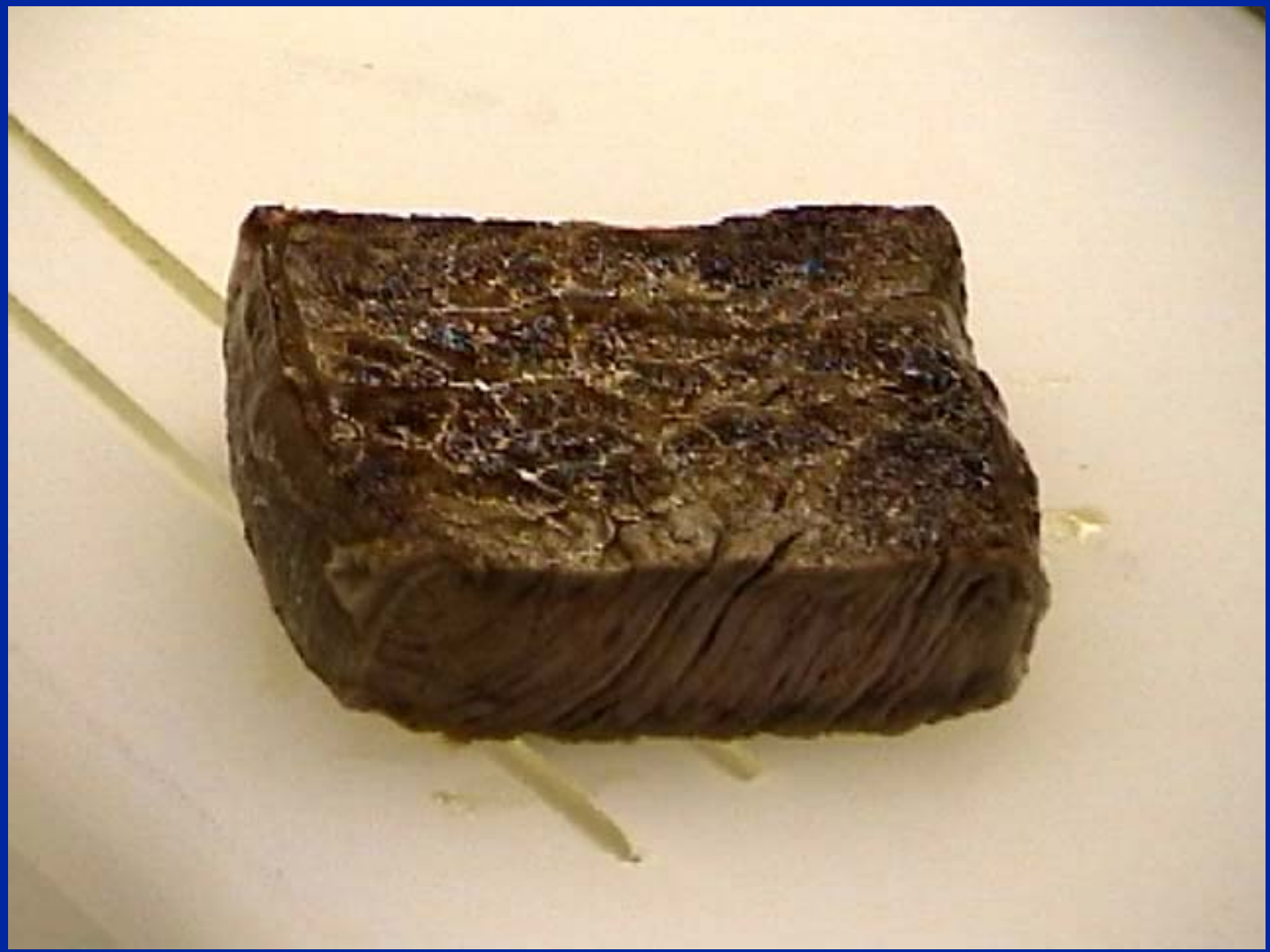
Step 2. Obtain the 5-cm long section



We now have a 5-cm long section from the lateral end of the longissimus with muscle fibers at a 45° angle.

5-cm section

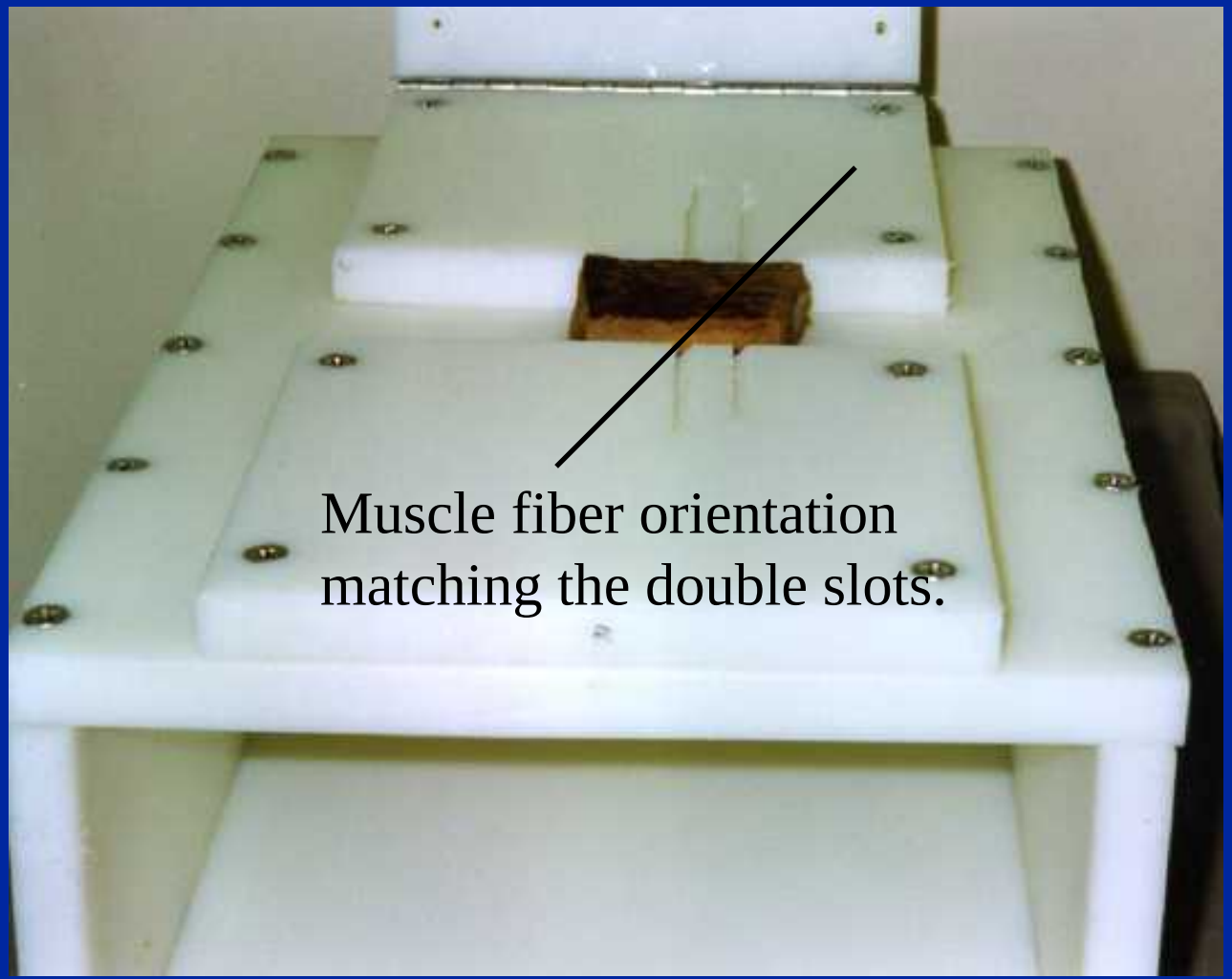
5-cm section with 45° fiber angle



Protocol

3. The 5-cm long section is placed in the slice box and centered on the two 45° slots with angle of the slots lined up with the muscle fiber angle.

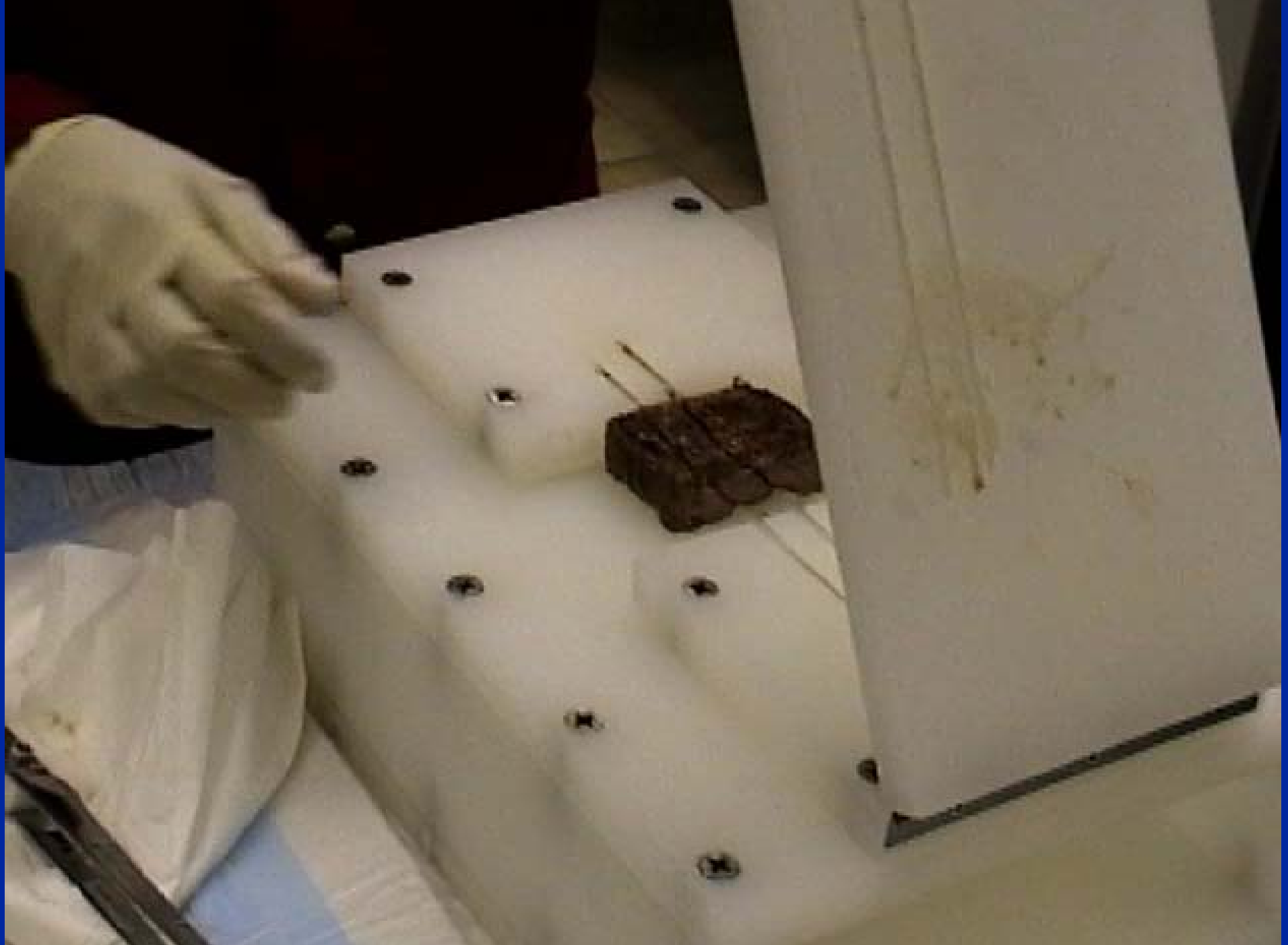
Muscle fiber orientation in slice box



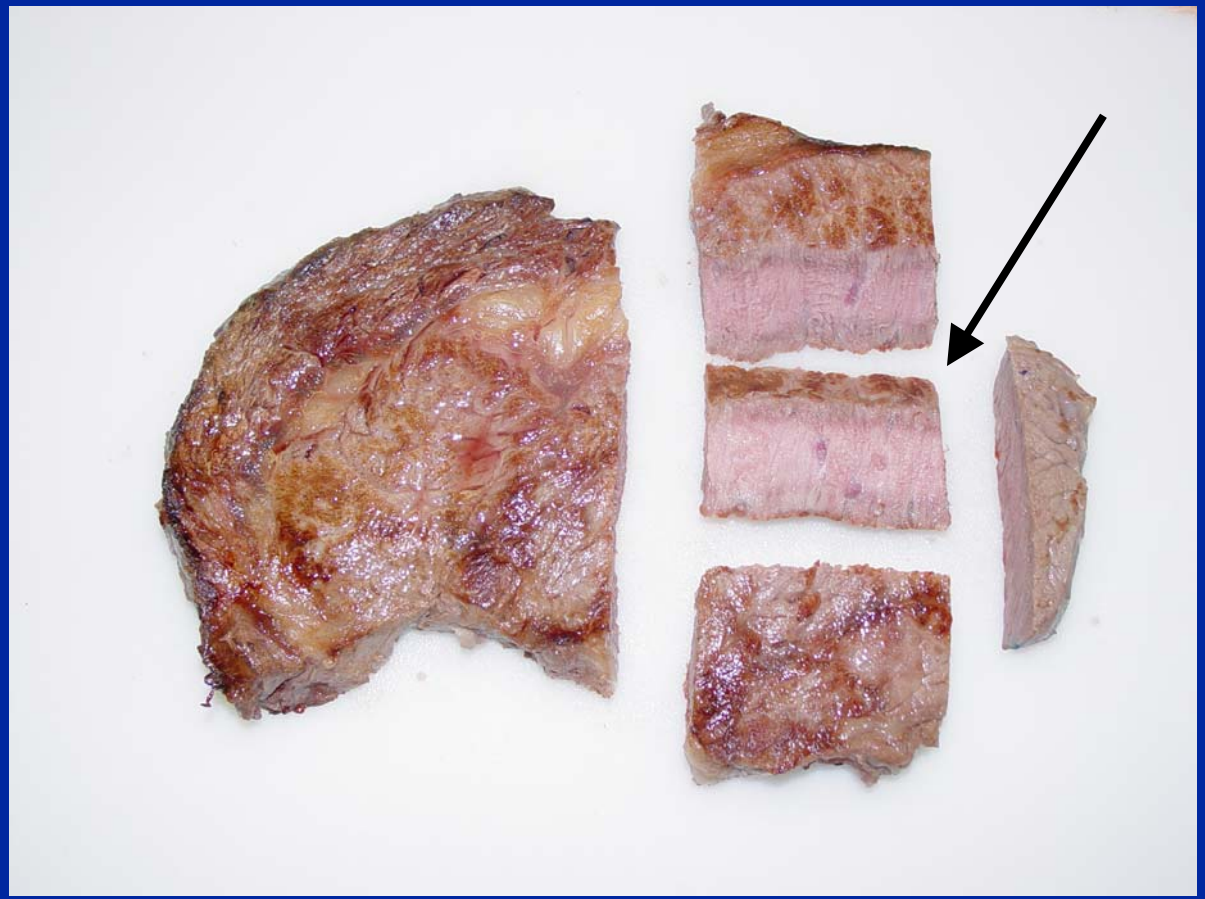
Protocol

4. Close the lid of the box. Insert the double-bladed knife that consists of two parallel blades spaced 1 cm apart into the slots at the back and make two parallel cuts simultaneously through the length of the 5-cm long section. This cut is made with 4 to 5 up-and-down sawing motion strokes while pulling the knife forward (the knife blades must be kept sharp to get a good “clean” cut, not tearing the meat). This cut provides a 1-cm thick, 5-cm long slice that is parallel to the muscle fibers.

Step 3. Obtaining 1 cm-thick, 5 cm-long slice



1 cm-thick, 5 cm-long slice parallel to fibers



1 cm-thick, 5 cm-long slice parallel to fibers

The slice is placed in the testing machine so that the blade shears perpendicular to the muscle fibers along the 5-cm dimension of the slice.

Slice shear force

The slice blade should be 1.016 mm thick with the cutting edge beveled to a half-round. The spacers creating the gap for the cutting blade to slide through should be 2.032 mm thick. The crosshead speed should be 500 mm/min.

Universal testing machine with 100 kg load cell